APPLICATION FOR UNITED STATES LETTERS PATENT

For

PORTABLE HIGH SPEED INTERNET ACCESS DEVICE

Inventor:

Raja Singh Tuli

Prepared by:

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026
(408) 720-8300

Attorney's Docket No.: 005965.P013D

"Express Mail" mailing label number: EV336590038US
Date of Deposit: 2-13-04
I hereby certify that I am causing this paper or fee to be deposited with the United States Postal Service "Express Mail Post Office to Addressee" service on the date indicated above and that this paper or fee has been addressed to the Commissioner for Patents, Washington, D.C. 20231

Kathleen K. Muto
(Typed or printed name of person mailing paper or fee)

Kathleen K. Muto
(Signature of person mailing paper or fee)

2-13-04
(Date signed)

PORTABLE HIGH SPEED INTERNET ACCESS DEVICE

"This application is a continuation in part of application number 09/496,172 filed on 02/02/2000."

Prior Art

The background of the present invention includes US Patent # 5925103, Internet Access Device, which describes an improved Internet access system, vastly different from the present invention. Other prior art would include palm top computers and hand-held computers that have limited processing power due to design restrictions. Thus, these computers are much slower for accessing the Internet and World Wide Web.

The present invention enhances the host computer's processing speed, data transfer and retrieval to and from the portable devices, with the aid of specialized embedded software in the host computer. The result is a cost effective Internet access solution.

Summary

It is an object of the present invention to disclose a portable device that can access the Internet and World Wide Web, at extremely low costs. It is another object of the present invention to provide fast access to the Internet such that refreshing a web page is quick and efficient.

The principal embodiment of the present invention discloses a portable device that comprises a modem that connects to a cellular telephone. Thus, the device has a wireless connection to the Internet. A host computer that runs a browser takes information received from the Internet and renders it onto a virtual display in its memory. This information is directed to software, which reduces the color depth of the information to a lower depth color image. This reduced image is then compressed by another software and sent to the portable device of the invention, for displaying to the user. Hence, the portable device received the compressed image, decompresses it, stores it into memory, and displays it for view. Thus, the user views a bit map image of a Web page.

The portable device comprises methods for pointing and clicking on text and images representing links to other Web pages. Clicking events are sent to the host computer that performs the commands via the browser. The host computer then sends the required information to the portable device as a compressed image. The portable device decompresses the image and the user views a new web page.

DETAILED DESCRIPTION OF THE DRAWINGS

The invention is described in more detail below with respect to an illustrative embodiment shown in the accompanying drawings in which:

Fig. 1 illustrates elements in the host computer, which communicates with a remote user and the device of the invention.

Fig. 2 illustrates the image to be displayed compared with the displayable area of a browser window.

Fig. 3 shows a typical subdivision of the image to be displayed.

Fig. 4 illustrates file formats received and sent by the host computer.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

To facilitate description, any numeral identifying an element in one figure will represent the same element in any other figure.

The principal embodiment of the present invention aims to provide a portable device that allows a user to access the Internet or the World Wide Web (WWW), which is a device similar to a portable computer. It is another aim of the present invention, to provide a method to develop a cost competitive device. It is a further aim of the present invention, to increase the speed of refreshing the screen when the user clicks on a link and commands another page to be displayed.

Currently, existing portable devices such as the Palm Pilot VII and Windows CE type devices contain an operating system, and within the operating system a mini-browser to interpret information received from the WWW or Internet and then display this information on the screen. This requires a powerful microprocessor.

The principal embodiment of the present invention is disclosed in **Figure 1**. A host computer **1** is depicted which is connected to the Internet, and that host computer receives information from outside in the form of HTML or JAVA or other formats, required to generate a web page. Running in the host computer, is a browser program **2** that takes all information received from outside and renders it onto a virtual display in its memory, hence a bitmap is made out of it. When a remote user **3** requests to view a Web page (or electronic message, etc.) the host computer **1** receives HTML, JAVA, or other types of information from outside the computer (as information may be gathered from a variety of different

sources) and the browser program **2** takes all information received from outside and renders it onto a virtual display in its memory. What is therefore rendered in the memory is a web page and this information is directed to another software **4**, which reduces the color depth of the information (i.e. the entire image comprising graphics and text) which is usually received in 24 bit color, subsequently reduced to a black and white bit map or raster image, in the preferred embodiment. Even though text may appear in black and white, the entire image may be 24 bit color which is reduced to black and white. This reduced image is then compressed entirely using a loss-less method of compression by software **11**, using G3 or G4 methods in the preferred embodiment. This compressed image is sent through a port in the host computer **1**, in the preferred embodiment, to the cellular telephone **12** of **Fig. 1**, which is connected to the portable high speed internet access device **18** of the invention. The portable device **18**, which contains a display screen **20** with a transparent touch panel and related microelectronics, receives the compressed image, decompresses the image, stores it into internal memory, and displays it for viewing to the user **3**.

In another embodiment, the cellular phone **12** of **Fig. 1** can be replaced by a wire less modem which is connected to the portable high speed internet access device **18** of the invention. This enables the portable device **18** to receive the compressed image, decompresses the image, store it into internal memory, and display it for viewing by the user **3**.

In another embodiment, the cellular phone **12** of **Fig. 1** can be replaced by a LAND line or PSTN which is connected to the portable high speed internet access device **18** of the invention. This enables the portable device **18** to receive the compressed image, decompresses the image, store it into internal memory, and display it for viewing by the user **3**.

In another embodiment of the invention, after the browser program **2** takes information received from outside and renders it onto a virtual display in its memory, this information is directed to software **4**, whereby the color depth of the information is reduced into a gray scale image. This reduced image is then compressed by software **11** and sent to the portable high speed Internet access device **18** of the invention, for displaying to the user **3**.

In a further embodiment of the invention, after the browser program **2** takes information received from outside and renders it onto a virtual display in its memory, this information is directed to software **4**, whereby the color depth of the information is reduced to any lower depth color image. This reduced image is then compressed by software **11** and sent to the portable high speed Internet access device **18** of the invention, for displaying to the user **3**.

In another embodiment of the invention, the browser program **2** takes information received from outside and renders it onto a virtual display in its memory, but not at the high depth of color as originally received. The browser **2** renders the image in a lower depth of color, such as a black and white image, in the preferred embodiment. Hence, the software **4** is not required for reducing the color depth of the information as the browser program **2** also performs this task. This reduced image is then compressed by software **11** and sent to the portable high speed Internet access device **18** of the invention, for displaying to the user **3**.

In another embodiment of the invention, the browser program **2** takes information received from outside and renders it onto a virtual display in its memory, but not at the high depth of color as originally received. The browser **2** renders the image in a lower depth of color, such as a gray scale image, in this embodiment. Hence, the software **4** is not required for reducing the color depth of the information as the browser program **2** also performs this task. This reduced

image is then compressed by software **11** and sent to the portable high speed Internet access device **18** of the invention, for displaying to the user **3**.

In another embodiment of the invention, the browser program **2** takes information received from outside and renders it onto a virtual display in its memory, but not at the high depth of color as originally received. The browser **2** renders the image into any lower depth of color, in this embodiment. Hence, the software **4** is not required for reducing the color depth of the information as the browser program **2** also performs this task. This reduced image is then compressed by software **11** and sent to the portable high speed Internet access device **18** of the invention, for displaying to the user **3**.

In another embodiment of the invention, the image that the browser program **2** renders onto a virtual display in its memory and is also reduced in color depth, is then compressed entirely using a lossy method of compression by software **11**. This compressed image is sent through a port in the host computer **1**, in the preferred embodiment, to the cellular telephone **12** of **Fig. 1**, which is connected to the portable high speed internet access device **18** of the invention. The portable device **18** receives the compressed image, decompresses the image, stores it into internal memory, and displays it for viewing by the user **3**.

In a further embodiment of the invention, the image to be sent to the portable high speed internet access device **18** of the invention is subdivided into a matrix array of smaller blocks of information at the host computer, and these subdivided blocks are sent to the portable device **18** each with an identifier containing information on every block's location in the matrix array. The portable device **18** receives the subdivided blocks of information and assembles them in correct sequence, as determined by the identifiers, to form the image which is then stored into its internal memory, to be displayed for the user **3**. The subdivided

blocks of information may not necessarily be sent from the host computer in any particular sequence, or received by the portable device in any particular sequence, since each block contains its own identifier which allows the portable device **18** to receive blocks in random order and place each block in its correct location to reconstruct the image, which is stored in its memory to be displayed to the user. Blocks may also be sent to the portable device in order of priority, which depends on the location of the display of the remote device with respect to the web page.

The image **5**, as shown in **Figure 2,** contains the information that would normally be displayed on a single Web page. As can be seen in **Figure 2**, the image **5** of the web page that is rendered by the browser **2** onto a virtual display in the memory is usually larger than the virtual window **6** of the browser. The entire image **5** of the web page is sent to the portable device **18**, to be displayed. The window **6** of the browser **2** running in the host computer **1** is set to be the same size as the display window **19** of the portable device **18**, because the portable device's display window is small, and most likely the web page is larger than the window of the browser in the host computer. The reason for setting the browser's window to be the same size as the portable device's window is for formatting purposes, so that text can be formatted to comfortably fit the size of the web page to be better displayed. In the preferred embodiment of the invention, the entire web page which is much larger than both the browser's window and the portable device's window, is rendered onto a virtual display in memory by the browser **2** in the host computer **1**, the color depth reduced, and the image compressed and sent to the portable device. The portable device receives this image, decompresses it, stores it into memory and displays it to the user.

A CPU resident in the portable device **18** therefore has the ability to decompress a bit map or raster image that may be larger than the size of the display and allow the user to traverse this bit map or raster image on the portable device. The primary method of traversing the image is through conventional scroll bars positioned at the sides of the image. However, buttons or icons may also be used to scroll on the portable device, to enable the user to move the web page relative to the display of the portable device. The CPU present in the portable device performs all scrolling functions, even though messages are sent to the host computer informing it of each scroll instruction. This allows the host computer to keep a track of the location of the portable device's display screen with respect to the web page.

The host computer receives vector information or compressed data from outside in the form of HTML, JPEG, etc., which is displayed on a web page. That image, in whole or parts, is recompressed and sent to the portable device. The recompressed data format sent to the portable device, is not necessarily in the same format as the compressed data format first received by the host computer, as illustrated in **Fig. 4**. For example, the incoming data from a Web page may be in the form of JPEG which is decompressed and displayed on the browser **2**. This data is recompressed and sent to the portable device but can be in the form of TIFF G4 or other formats, and not necessarily JPEG as initially received.

Another embodiment involves the host computer receiving vector information such as HTML or text and then rasterizing it to bit map format. It can then shown in memory through the virtual browser and is recompressed through a "loss less" method and sent to the portable device.

The image **5** is further divided into sections **7, 8, 9,** and **10,** as shown in **Figure 3**. The image is divided after the bitmap or raster is created. The reason for the

division (as will be explained later) is for the purpose of display priority on the user's display. The image **5** is then sent to another program **11** running on the host computer **1 (Fig. 1)**, which compresses the image using a loss-less compression method. The compression method may be group 3 or group 4, or another method. The information is received by a portable device **12** that has the ability to display a monochrome image, in its display window **19.** The information is decompressed and displayed in the order of priority such that part of image **7**, which substantially or completely covers the displayable area **19 (Fig. 2)**, of the palm device is decompressed and displayed first and then sequentially the portions **8, 9, 10** of the image are decompressed and stored in an internal memory of the portable device to be displayed later when the user scrolls up, down, or sideways to these parts of the image.

The resident CPU on the portable device has no ability to determine which parts part or parts of the image, that is being displayed, represent links to other Web pages etc. Thus, the browser **2 (Fig. 1)** renders the image in the virtual window **6** of the browser, such that the words that represent links on the image **5** of the web page **(Fig. 2)** are translated to be slightly bolder. The user may therefore consider text that is bold or another color to be links.

The portable device provides the user with a pointing device. This pointing device may be a touch screen or tracking ball, etc. The portable device also allows the user to click on specified areas. As soon as the user clicks on part of an image, the shape of the pointer changes from an arrow to an hourglass. This operation is performed by the CPU of the portable device. A message is sent to the host computer, transmitting the location of the clicked down event. A program **14** interprets the message and provides a virtual click down in the browser **2.** If the user has pressed in an area of the image that does not represent a link or text box, a message is dispatched to the portable device

which immediately changes the hourglass shape of the pointer back to an arrow (in the case of a touch screen, from an hour glass to nothing). Further to this, if the user has clicked on a part of the image which represents a link, a new Web page is extracted from the Internet or WWW, rendered onto a virtual display in memory by the browser **2** in the host computer **1**, the color depth reduced, and the image compressed and sent to the portable device. The portable device receives this image, decompresses it, stores it into memory and displays it to the user.

For every new web page transferred to the portable device, only the contents of the browser window **6** are transferred. Other items such as the title, scroll bars, menu items, etc., are not sent to the portable device. These buttons and menu items are implemented on the portable device, and are sent once by the host computer to the portable device each time the device is powered on and initialized. Once the portable device receives the layout of these buttons and menu items, they are stored into memory and displayed on the screen.

In another embodiment, the layout of these buttons and menu items are hard coded in the memory of the portable device. Each time the device is powered on and initialized, these buttons and menu items are retrieved from memory and displayed on the screen, without any communication from the host computer.

When the user clicks in a text box or in a box in the display area into which letters or numbers must be input, the cursor first changes into an hourglass, and a message is sent to the host computer. The host computer recognizes that the click down event has occurred in the text box, and sends a message back to the portable device to inform the portable device to pop-up a keyboard on part of the screen. The user then types, using the pointer, the letters or words to be entered into the text box and presses "enter" or "go". The keyboard then disappears and

the cursor changes back to an hourglass shape (in another embodiment, the keyboard could be replaced with a real keyboard or with an area that recognizes users' handwriting). The information typed into the text box is transmitted in a message to the host computer. The host computer enters the information into a text box in the browser.

The user sees, after a short pause, as the image is refreshed on the portable device, that the words, or letters or numbers have been entered into the text box. Further to this, the host computer may also break up the image such that the portion that has been changed, i.e. the text box area, is sent first.

In another embodiment, the user can click on an image of a web page on the screen of the portable device, and a message is sent to the host computer whereby the browser inputs that click into the same location on the corresponding web page, which causes another web page to be received from outside. This new web page is rendered onto a virtual display in memory by the browser **2** in the host computer **1**, the color depth reduced, the image compressed and sent to the portable device. The portable device receives this image, decompresses it, stores it into memory and displays it to the user.

In a preferred embodiment of the invention, when the user clicks on an image of a web page on the screen of the portable device, a message is sent to the host computer which contains information of the click location relative to the web page, and not only information of the click location relative to the display of the device.

In another embodiment of the invention, when the user clicks on an image of a web page on the screen of the portable device, a message is sent to the host computer informing it of the exact click location relative to the display and also

the location of the display relative to the web page. This allows the host computer to deduce exactly where the click location occurred relative to the web page.

In a further embodiment of the invention, when the user clicks on an image of a web page on the screen of the portable device, a message is sent to the host computer informing it of the exact click location relative to the display, but the host computer already knows where the display is relative to the web page, as the previous scrolling action would have sent a message to the host computer informing where the display has scrolled to relative to the web page. If there was no scrolling action, the host computer would know the exact location of the browser's window with respect to the web page, as this would have been the first set of compressed data sent to the portable device from the host computer. This allows the host computer to deduce exactly where the click location occurred relative to the web page.

In another embodiment of the present invention, images are only refreshed when an event occurs such as a mouse down event on a link or in a text box.

In a further embodiment only those portions of the image that change may be transmitted from the host computer to the portable device. Other images in the virtual browser that are continuously changing, such as banner advertisements, may be the only other images sent to the portable computer as they change.

In the principal embodiment, the portable device also contains a modem, which can be linked to the user's mobile telephone **12** and information that is communicated between the portable device and the host computer is sent and received wirelessly through the mobile telephone.

Furthermore, the portable device only contains enough memory to store the current displayable page. When the user presses a back or forward button, a message is sent to the host computer, and the host computer sends the reference page. The back and forward buttons etc. may be hard wired into the portable device, or may be part of the display area.

Further to this, part of the image representing buttons (and other things) on the browser may be sent as part of the compressed image and buttons such as forward and back may be treated the same way as links are handled as previously described.

In another embodiment, the portable device comprises a modem that permits the device to connect to a cellular telephone **12** in digital format.

In another embodiment, the connection to the cellular telephone **15** is made through an analog modem connected to an ear jack of the cellular telephone.

In yet another embodiment of the present invention, the modem is replaced by an analog modem that has the capability to be connected to a landline providing a standard 56kbps-type connection.

Further embodiments may provide connections through ISDN, cable modems etc.

In a further embodiment, the portable device may contain a large screen to be used in a fashion similar to a home Internet appliance.

In a further embodiment, the image transferred between the host computer and the remote device (previously the portable device) may be a color image and the

compression method used may be of a JPEG or other compression methods used for color images. A gray scale image may also be used to reduce bandwidth or display costs.

In a further embodiment, the device includes no screen, but only outputs to be hooked to a television screen or external monitor for display.

The remote device in the principal embodiment only has the ability to decompress the image it receives; display the image it receives; allow the user to scroll through the image; provide the user with a pointing device to point and click on the image; send messages providing location of click down event; provide the user with a method to input letters and numbers; send a message containing these letters and numbers.

The principal embodiment contains no other structured or intelligent information about the image.